Table 4-5. Toxic Air Pollutant Emission Rates (kilograms per year)

Pollutant	SNL/CA					Bay Area	Percent Contribution from SNL/CA
	Emission Year[a]						
	96/97	97/98	98/99	99/00	00/01	1999	
1,1,1-trichloroethane	91.226	39.01	144.24	235.1	96.15	58,968	< 1
1,4-dioxane	4.189	0.00	2.81	5.5	0.54	771	< 1
Ammonia	238.412	205.93	99.79	33.4	1.31	1,406,160	< 1
Benzene	0.31	0.32	0.32	0.32	0.30	28,577	< 1
Carbon tetrachloride	0.006	0.36	0.00	0.00	0.00	1,406	NA
Formaldehyde	3.133	3.4	3.22	3.26	3.12	81,648	< 1
Methyl alcohol	1.821	1.86	0.00	167.22	681.77	276,696	< 1
Methylene chloride	11.027	16.78	49.9	50.2	75.55	49,896	< 1
Perchloroethylene	13.013	24.49	74.84	42.7	73.55	371,952	< 1
Toluene	0.07	0.09	0.09	3.3	43.04	335,664	< 1
Trichloroethylene	66.391	NA	NA	0.00	2.93	21,773	< 1
Xylene	0.015	0.01	0.01	0.002	14.77	276,696	< 1

Sources: SNL/CA 2002b
[a]Bay Area Air Quality Management District (BAAQMD) inventory is reported annually for period July to June.
<: less than
NA: Not Available
SNL/CA: Sandia National Laboratories, California

4.9 INFRASTRUCTURE

4.9.1 Definition of Resource

Infrastructure consists of buildings, services, maintenance, utilities, material storage, and transportation systems and corridors that support the operations of a facility. Specifically, SNL/CA's infrastructure consists of water, sanitary sewer systems, storm drains, electrical transmission and distribution, communication systems, roads, and parking lots that support operations at the site. For a discussion of land use, see Section 4.3.

4.9.2 Region of Influence

The ROI for infrastructure is within the site boundary. Table 4-6 presents information on the type of utilities and amounts used by SNL/CA, and identifies utility capacities.

4.9.3 Affected Environment

4.9.3.1 Sandia National Laboratories, California Buildings

Buildings within SNL/CA are listed by type and square footage in Table 4-7. Physical attributes such as construction type, gsf, and usage distinguish primary buildings.

4.9.3.2 Sandia National Laboratories, California Services and Maintenance

SNL/CA's management and operations (M&O) contractor is Lockheed Martin Corporation. SNL is organized into twelve divisions including the California laboratory (SNL/CA). Extensive descriptions of key programs and services are provided in the *SNL Institutional Plan Fiscal Year 2002-2007* (SNL 2001a). SNL/CA has a maintenance program supported by appropriate NEPA review. Routine maintenance and upgrades include the following:

- cleaning, painting, repairing, renovating, and servicing buildings, equipment, vehicles, and utility infrastructure;
- maintaining and extending onsite roads, parking areas, and access control structures;
- replacing, upgrading, and maintaining equipment, tools, and components, such as computers, valves, pumps, filters, monitors, and equipment controls to preserve, improve, and extend the life of the infrastructure; and
- maintaining, replacing, and upgrading environment, safety, and health equipment, controls, and monitoring capabilities.

4.9.3.1 Roadways and Transportation Access

The general road network in SNL/CA area is shown in Figure 4-16. Interstate 580 is the east-west access to the regional Interstate system and is approximately 2 miles north of the SNL/CA boundary. Access to SNL/CA consists of an urban road network maintained by the City of Livermore, and SNL/CA maintained gates and roadways.

Traffic enters SNL/CA through two principal gates off East Avenue. Commercial traffic enters through the East

Table 4-6. Utility Capacities and Quantities Used by Sandia National Laboratories, California

Utility	Usage	
	SNL/CA (2000)	Percent of Capacity
Water	54 M gallons	6[a]
Wastewater	15 M gallons	19[b]
Electricity	22,434 MWh	9[c]
Natural Gas	59 M ft^3	14[d]

Sources: SNL/CA 2002b, Royer 2002
[a]Estimate Based on 14" water main with 8,000 gallons per minute, 8 hours per day, 5 days per week, 48 weeks per year (922 M gallons). A 16" water main is also available.
[b]Estimate based on 10" wastewater with 700 gallons per minute, 8 hours per day, 5 days per week, 48 weeks per year (81 M gallons).
[c]Estimate based on 27.2 Megawatt feeder, 8760 hours per year, (239,000 Megawatt hours). Another 27.2 Megawatt feeder is also available.
[d]Estimate based on 49,140 cubic feet per hour, 8760 hours per year (430 M cubic feet).
M: million
MWh: megawatt
M ft^3: million cubic feet
SNL/CA: Sandia National Laboratories, California

Table 4-7. Building Types at Sandia National Laboratories, California

SNL/CA Building Types	Number of Buildings	GSF	Percent of GSF	Parameters
Primary Buildings	33	690,000	91	Buildings > 3,000 gsf permanent, semi-permanent, or wood/steel construction; not leased space
Nonprimary	21	30,000	4	Nonprimary buildings < 3,000 gsf
Temporary	18	40,000	5	Mobile Offices
Total	72	760,000	100	

Sources: SNL 2001b
>: greater than
<: less than
gsf: gross square feet
SNL/CA: Sandia National Laboratories, California

gate because it provides direct access to the SNL/CA shipping and receiving facilities. SNL/CA maintains approximately 6.2 mi of paved and unpaved roads, approximately 4 acres of pedestrian malls, approximately 5.5 acres of paved service areas, and approximately 12.7 acres of paved parking areas (TtNUS 2002a). The roads near SNL/CA experience heavy traffic in the early morning and late afternoon. The principal contributors are SNL/CA staff and LLNL personnel commuting to and from the laboratories.

Survey estimates of employee-related traffic entering SNL/CA are between 700 to 1,000 SNL/CA commuters per day (SNL/CA 2002b). SNL/CA commuters represent approximately 11 percent of commuter traffic near SNL/CA based on an estimated 9,000 LLNL commuters. For a discussion of transportation-related issues such as traffic, see Section 4.10.

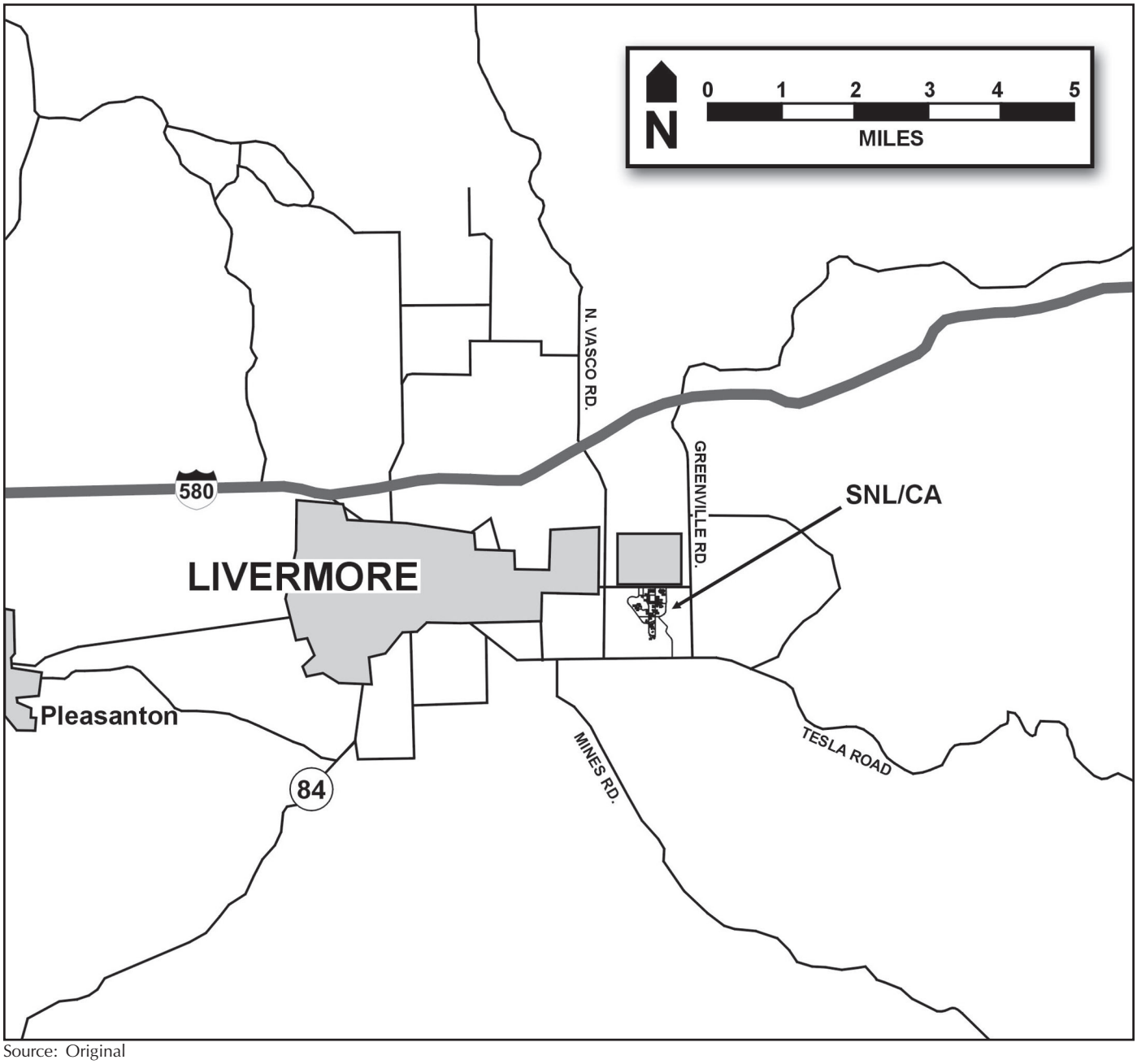
Rail facilities are not available on SNL/CA. Primary air service is provided for the entire region by both the Oakland International Airport and the San Francisco Airport, located approximately 33 mi and 50 mi west, respectively.

4.9.3.2 Water

The water supply system consists of 6.4 mi of piping that, in 2000, provided 54 M gal of water for fire protection, industrial support of SNL/CA's research programs, and sanitary use (Table 4-6). The highest volume user is the Combustion Research Facility (CRF), which generates approximately 160,000 gal of wastewater per year (SNL/CA 2002a). SNL/CA purchases potable water from the adjacent LLNL. LLNL is supplied by the San Francisco Water District through the Hetch Hetchy Aqueduct. When needed, water is also supplied by the Alameda County Flood Control and Water Conservation District. LLNL maintains the drinking water distribution system at SNL/CA. Neither the existing water service from LLNL to SNL/CA, nor water to most major SNL/CA facilities, are metered. For a discussion of water resources, see Section 4.5.

4.9.3.3 Sanitary Sewer

In 2000, the sewer system consisted of a 4.4-mi underground pipe network that discharged approximately 15 M gal per year of industrial and domestic wastewater



Source: Original

Figure 4-16. Road Network in the Sandia National Laboratories, California Area

(Table 4-6). The site operates a wastewater management control system whereby potentially contaminated laboratory wastewater is routed to retention tanks for analysis and proper disposal. The Liquid Effluent Control System (LECS) provides a fail-safe mechanism for preventing any release of regulated materials from reaching offsite. Six LECS units currently serve SNL/CA (SNL 2001b).

4.9.3.4 Storm Drain

As part of its storm drain system, SNL/CA maintains approximately 4.3 mi of pipe and 1.6 mi of channel. Existing drainage channels require continuous maintenance to correct erosion problems and remove weeds, sediment, and debris that inhibit proper flow (SNL 2001b).

4.9.3.5 Electrical Transmission and Distribution

SNL/CA maintains approximately 11.9 mi of electrical transmission/distribution lines (SNL 2001b). In 2000, 33 primary facilities/areas used 22,434 megawatt hours (MWh) (Table 4-7) (SNL/CA 2002b).

4.9.3.6 Natural Gas

SNL/CA maintains 1.8 mi of gas line. Natural gas is the primary heating fuel used at the site. Laboratories also use natural gas in many of the buildings for experiments. In 2000, 33 primary facilities/areas used approximately 59 million cubic feet (M ft^3) (SNL 2001b; SNL/CA 2002b).

4.9.3.7 Communications

SNL/CA maintains 19.7 mi of communication lines. Surveys indicate that the system may be nearing capacity, however, system upgrades are meeting the current demand for data links (SNL 1997b, 2001b).

4.10 TRANSPORTATION

4.10.1 Definition of Resource

This section describes current regional and local transportation activities, including descriptions of any highway, rail, air, or marine transportation infrastructure that the DOE uses to support hazardous material and waste movements at SNL/CA. Transportation activities at SNL/CA involve the receipt, shipment, and transfer of hazardous and nonhazardous materials and waste. Receipt refers to material received from an offsite location; shipment refers to material sent to an offsite location; and transfer refers to material moved from one onsite location to another. Actual waste quantities are discussed in Section 4.11.

4.10.2 Region of Influence

The transportation ROI consists of three areas onsite, the major transportation corridors in Livermore, and the routes to DOE facilities and waste disposal sites.

4.10.3 Affected Environment

SNL/CA's transportation system consists of paved and unpaved roads, pedestrian malls, paved service areas, and paved parking areas. The site has 6.2 mi of paved and unpaved roads, 4 acres of pedestrian malls, 5.5 acres of paved service areas, and 12.7 acres of paved parking areas.

Onsite (excluding parking areas) vehicular traffic is comprised of General Services Administration vehicles, such as cars, light trucks, gasoline and electric carts, medium duty trucks, forklifts, cranes, and other equipment. Delivery trucks are generally routed only to shipping and receiving facilities. Vehicles owned by organizations performing work (such as construction) for SNL/CA are permitted around the site when necessary for the performance of the work.

A taxi service is provided for workers needing transport on site. LLNL provides a taxi service that will pick up Sandia workers and transport them to LLNL. Sandia also provides bicycles for personnel to use for onsite transportation.

All entrances to SNL/CA are situated along East Avenue. The primary routes to East Avenue are Vasco Road and Greenville Road. All regional traffic to and from SNL/CA is via I-580, exiting onto Vasco Road or Greenville Road. An emergency access road connects the site to Telsa Road to the south.

The regional transportation network includes the San Francisco Bay Area. Traffic congestion is a growing concern in the Bay Area. The major transportation arteries near SNL/CA are I-580 and I-680. Major road projects are underway including an upgrade to the Interstate (I)-580/I-680 interchange in Pleasanton and the addition of high-occupancy-vehicle lanes to I-680 south of Pleasanton (SNL/CA 2002b).

The closest airport to SNL/CA is the Livermore Municipal Airport. This airport is not used for commercial passenger traffic, but DOE/SSO personnel fly into this airport using a small government jet. DOE/SSO typically use the Livermore airport for less than five trips per year (SNL/CA 2002b).

The SNL/CA site is served by three international airports for commercial passenger and airfreight services. These airports are San Francisco (approximately 50 road mi west), Oakland (approximately 33 road mi west), and San Jose (approximately 32 road mi south) (SNL/CA 2002b).

SNL/CA does not receive any direct traffic by rail although some SNL/CA employees do commute by train that stops on Vasco Road approximately 1.5 mi north of the site. SNL/CA receives no direct traffic by ship (SNL/CA 2002b).

4.10.3.1 Responsible Organizations for the Transport of Hazardous and Nonhazardous Material

The organizations responsible for the receipt, shipment, and onsite transfer of hazardous material and nonhazardous material are identified in Table 4-8. Table 4-9 shows all hazardous and radioactive waste shipments from SNL/CA site during calendar year 2000. Other shipments would go to LLNL and Sandia sites including SNL/NM. Approximately 1 to 3 shipments per week come in from offsite suppliers.

Explosives Receipt, Transfer, and Shipment

All incoming explosive material placarded or labeled DOT Division 1.1, 1.2, 1.3, 1.5, or 1.6 is diverted by security directly to the Explosives Storage Area. Division 1.4 materials may be received at either Shipping and Receiving Building or the Explosives Storage Area. Incoming explosives are entered into the Explosives Inventory and Information System (SNL/CA 2002b).

Explosives are delivered only to persons authorized on the destination building's Safe Operating Procedure. Explosives are delivered only to approved facilities. The explosives handler completes a Storage Action Request for Explosives form. Before movement is allowed, a signature must be obtained from the Explosives Safety Engineer. An Explosives Handler, using an approved container and Vehicle transports explosives (SNL/CA 2002b).